ONTARIO MINISTRY OF ENVIRONMENT
36936000023801

OPERATING SUMMARY

BELLEVILLE

water pollution control plant

1968

ABORATORY LIBRARY
ATER RESOURCES COMMISSION

IBRARY COPY
JUL 30 1969
ONTARIO WATER
ESOURCES COMMISSION

TD
367
.A56
B45
1968
MOE

LABORATORY & RESEARCH LIBRA
MINISTRY OF THE ENVIRONMENT

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

#1

TD
367
.A56
B45
1968

Belleville : water pollution
control plant.

81624

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 7
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.

D L Caverly
D. S. Caverly,
General Manager.

D McTavish
D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

LIBRARY COPY
JUL 30 1969
ONTARIO WATER
RESOURCES COMMISSION

LABORATORY LIBRARY
ONTARIO WATER RESOURCES COMMISSION

TD
227
B45
W38
1968
NOE

esen

BELLEVILLE

water pollution control plant

operated for

THE CITY OF BELLEVILLE

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN
Dr. James A. Vance

VICE-CHAIRMAN
J. H. H. Root, M. P. P.

COMMISSIONERS
H. F. Brown
D. A. Moodie
L. E. Venchiarutti

GENERAL MANAGER
D. S. Caverly

ASSISTANT GENERAL MANAGERS
L. E. Owers
K. H. Sharpe
F. A. Voege
A. K. Watt

COMMISSION SECRETARY
W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

Director
D. A. McTavish

Assistant Director
C. W. Perry

Regional Supervisor
P. J. Osmond

Operations Engineer
J. N. Dick

135 St. Clair Avenue West
Toronto 7

Digitized by the Internet Archive
in 2015

https://archive.org/details/bellevillewaterp23801

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

CONTENTS

Title Page i

Foreword ii

'68 Review 1

Project Costs 2

Operating Costs 3

Process Data 5

Conclusions . . . . Inside back cover

'68 REVIEW

The operating cost for the year was $71,560.53, an increase of $16,246 over 1967.

The unit cost of treating one million gallons increased from $23.09 in 1967 to $32.98 in 1968. Increased costs were reflected in salaries, taxes, and power. The chlorination season was changed to a year-round basis, resulting in increased costs for water and chlorine.

FLOWS

In 1968, the plant treated an average flow of 5.95 mgd, which was 198 percent of the design capacity of 3.0 mgd. This design flow was exceeded 98 percent of the time during the year. The percentage reduction of BOD and suspended solids was 52 and 51 respectively. The average BOD and suspended solids concentrations in the final effluent were 55 mg/l and 114 mg/l respectively, and the average concentration of BOD and suspended solids in the raw sewage were 114 mg/l and 234 mg/l respectively.

In 1967 the average concentration of BOD and suspended solids in the raw sewage was 117 mg/l and 185 mg/l respectively.

SPECIAL PROBLEMS

The water service line entering the Dundas Street pumping station broke in 1968 and flooded the dry well of this pumping station. The plant barminutor was completely overhauled in 1968. Because of the high concentration of the digested sludge, considerable difficulty has been experienced in pumping this material.

In 1968, a positive deplacement pump was purchased to facilitate pumping digested sludge. New rotors were installed in the No. 2 air blower, and three pump shafts were replaced in the pumping stations.

PROJECT STAFF

Agreement was reached between the Civil Service Association of Ontario and the plant operators late in 1968 for a three-year contract. Since this settlement was retroactive to January 1, 1968, salary costs were greater than expected.

PROJECT COSTS

NET CAPITAL COST (Final)		$2,009,824.50
DEDUCT - Portion Financed by CMHC-MDLB (Final)		1,283,187.17
Long Term Debt to OWRC	$	726,637.33

Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968.	$	91,996.51

Net Operating	$	71,560.53
Debt Retirement		14,457.00
Reserve		10,942.37
Interest Charged		40,412.77
TOTAL	$	137,372.67

RESERVE ACCOUNT

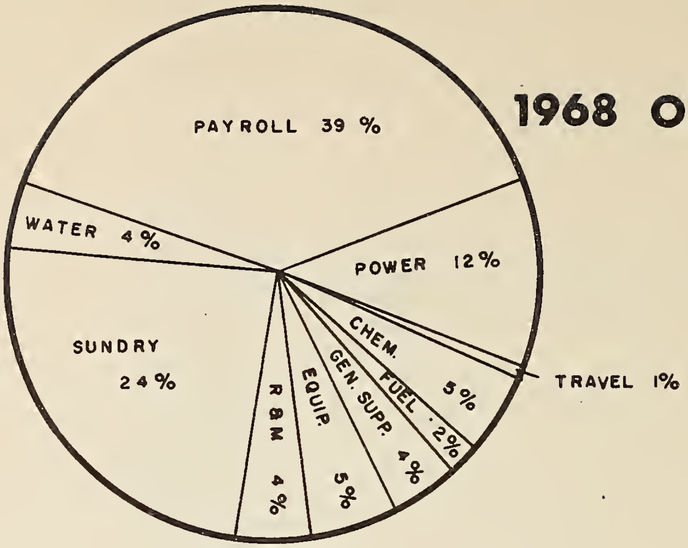
Balance at January 1, 1968	$	65,371.13
Deposited by Municipality		10,942.37
Interest Earned		4,114.38
	$	80,427.88
Less Expenditures		-
Balance at December 31, 1968	$	80,427.88

Monthly Operating Costs

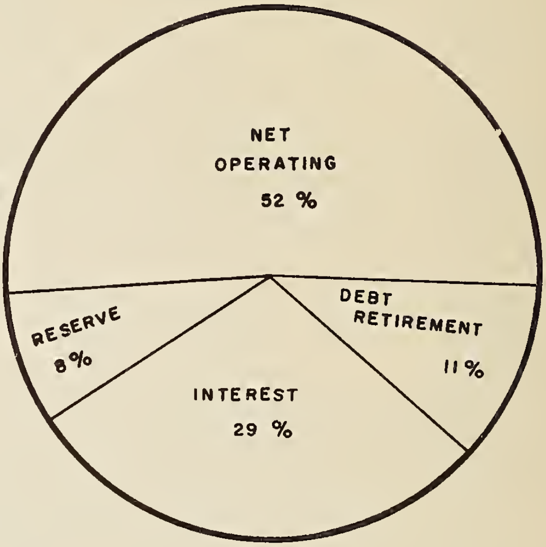
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	2766.56	1872.41	-	116.13	284.72	-	105.01	-	113.22	171.45	52.52	51.10
FEB	3443.51	1857.02	-	-	787.75	-	101.27	55.11	497.93	14.71	73.02	56.70
MAR	6191.02	3042.25	-	480.54	853.88	-	369.11	-	104.52	1203.14	74.58	63.00
APRIL	3704.18	1864.73	-	240.35	636.46	-	95.32	-	399.73	347.81	53.56	66.22
MAY	4121.88	1897.20	-	117.60	713.65	-	540.10	350.50	144.52	210.78	85.15	62.30
JUNE	11175.11	1879.88	70.00	-	642.38	1198.05	128.03	-	116.40	6940.37	134.34	65.66
JULY	4710.67	1843.62	266.00	117.60	678.80	-	94.37	735.44	62.62	505.95	341.31	64.96
AUG	4270.62	2799.83	350.59	-	310.80	17.92	123.17	66.06	184.04	-	349.89	68.32
SEPT	5228.66	1859.31	89.25	-	999.65	1198.05	291.90	-	165.17	193.33	365.92	66.08
OCT	9439.18	2013.22	21.00	-	780.91	-	325.63	-	157.08	5628.40	389.21	123.73
NOV	6689.00	1888.09	329.32	-	619.48	1198.05	287.79	-	556.26	1397.51	283.45	129.05
DEC	9820.14	3642.65	-	339.29	1077.73	-	465.62	2562.76	712.34	533.24	402.36	84.15
TOTAL	71560.53	26460.29	1126.16	1411.51	8386.21	3612.07	2927.32	3769.87	3213.83	17146.69	2605.31	901.27

*SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $2,070.00

1968 OPERATING COSTS



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1964	1880	$41,245.00	$21.94	$0.025
1965	2070	45,122.00	21.80	0.05
1966	1994	51,665.00	25.91	0.08
1967	2396	55,314.00	23.09	0.03
1968	2170	71,560.00	32.98	0.06

Process Data

The probability of flows graph shows that 50 percent of the time the flow exceeded six mgd. The curve further showed that the design flow of the plant (three mgd) was exceeded more than 98% of the time.

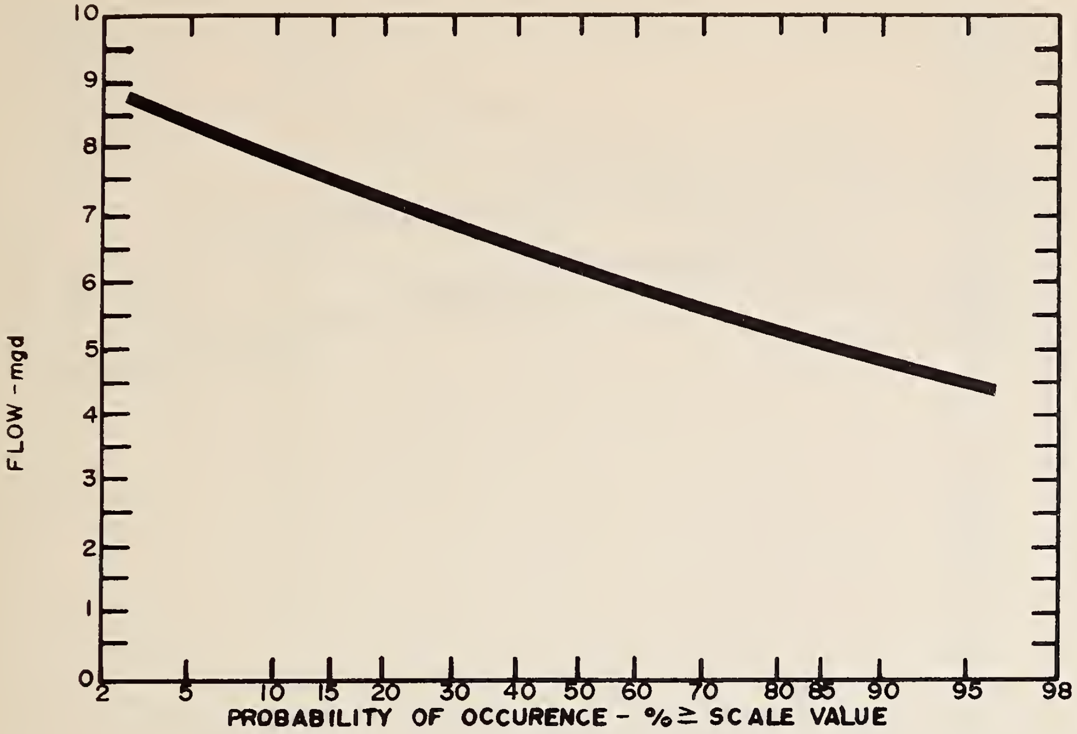
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED 10^3 lbs.	DOSAGE mg/l
JAN	210.6	6.80	8.80	6.20	-	-
FEB	202.3	6.98	8.70	6.10	-	-
MAR	215.3	6.95	8.80	5.50	-	-
APR	175.9	5.86	8.00	5.10	-	-
MAY	191.5	6.18	9.10	5.10	3.17	3.9
JUN	192.6	6.42	9.70	5.20	5.62	2.9
JUL	168.3	5.43	7.10	4.40	4.93	2.9
AUG	171.8	5.54	6.70	4.80	5.68	3.5
SEPT	151.1	5.04	8.30	3.40	6.01	4.0
OCT	149.8	4.83	7.30	3.80	6.10	4.1
NOV	176.0	5.87	9.00	3.40	4.91	2.8
DEC	162.7	5.25	7.20	4.20	5.50	3.4
TOTAL	2167.9	-	-	-	41.92	-
AVERAGE	-	5.90	-	-	5.24	3.3

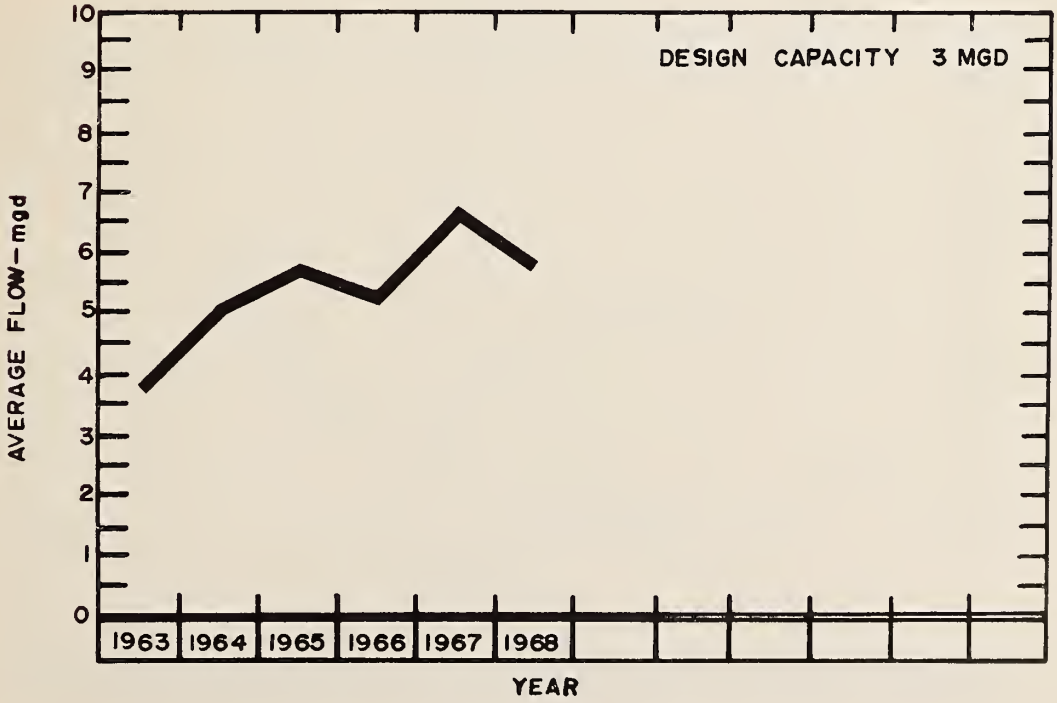
COMMENTS

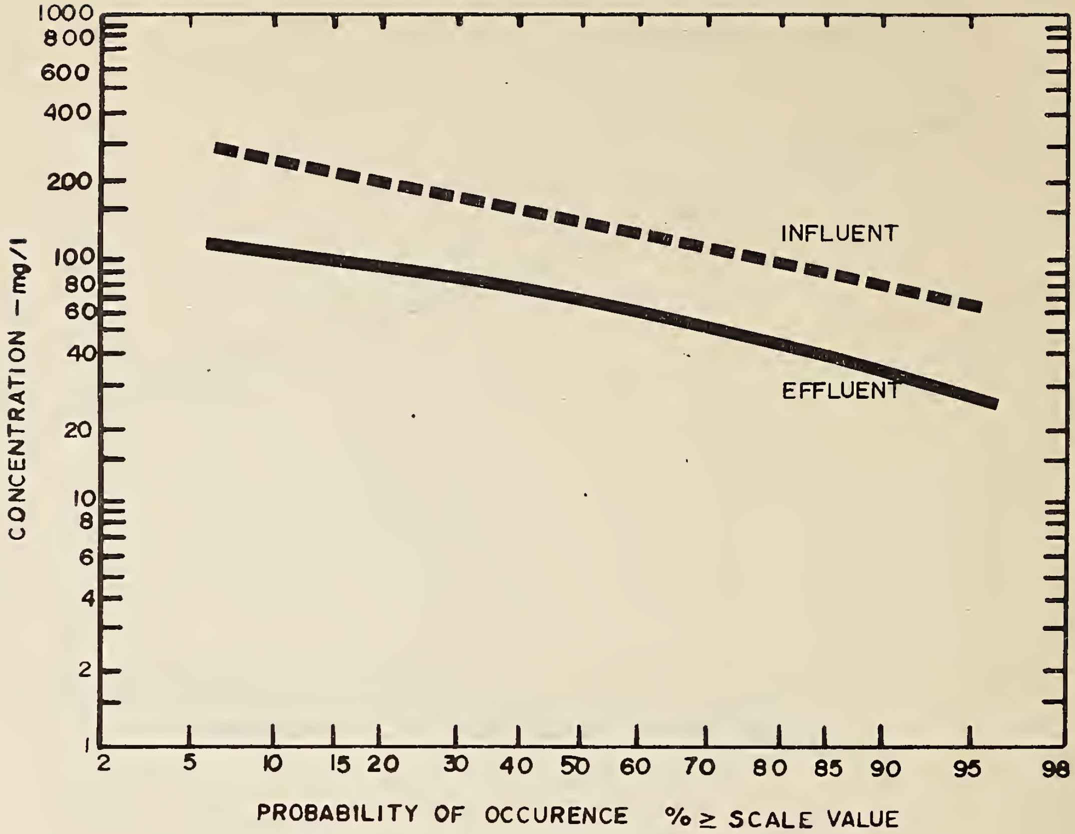
The chlorination period was changed in 1968 from seasonal to year-round chlorination. An average of 3.3 mg/l of chlorine was required, to obtain a chlorine residual of 0.5 mg/l after 15 minutes of contact.

The average daily flow of raw sewage to the plant was 5.95 mgd. The maximum daily flow was received in June (9.7 mgd) and the minimum flow was recorded in September (3.4 mgd).

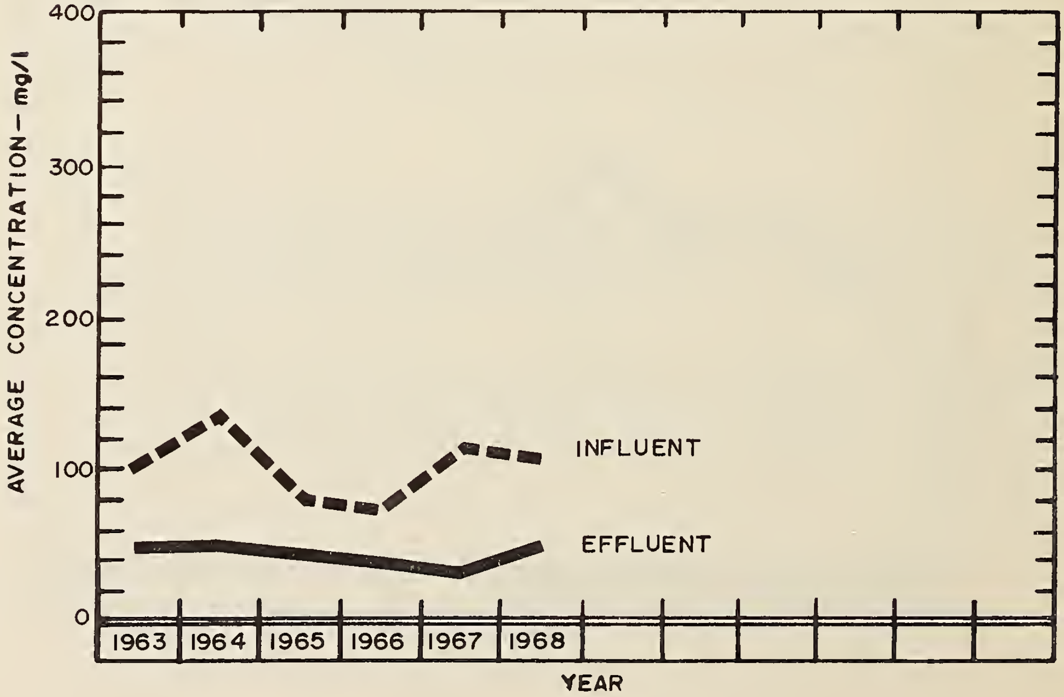

10
9
8
7
6
5
4
3
2
1
0
FLOW - mgd
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - %≥ SCALE VALUE

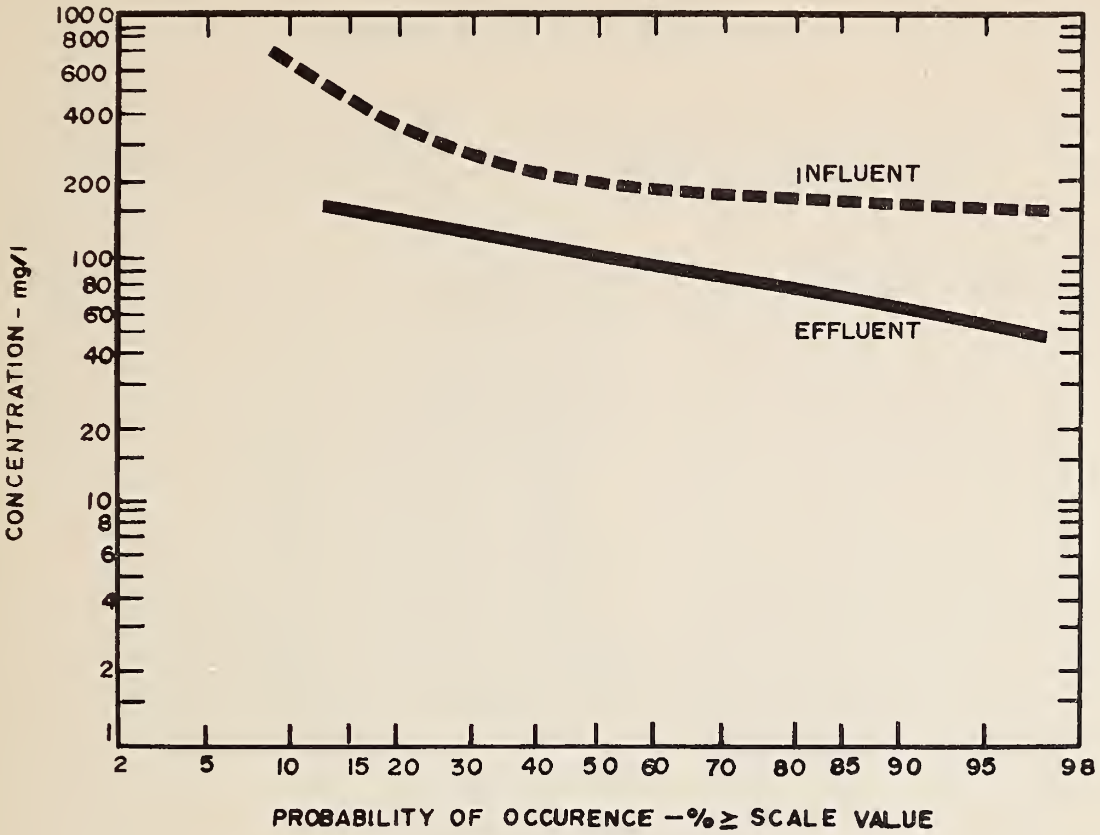
FLOWS


10
9
8
7
6
5
4
3
2
1
0
AVERAGE FLOW-mgd
DESIGN CAPACITY 3 MGD
1963
1964
1965
1966
1967
1968
YEAR

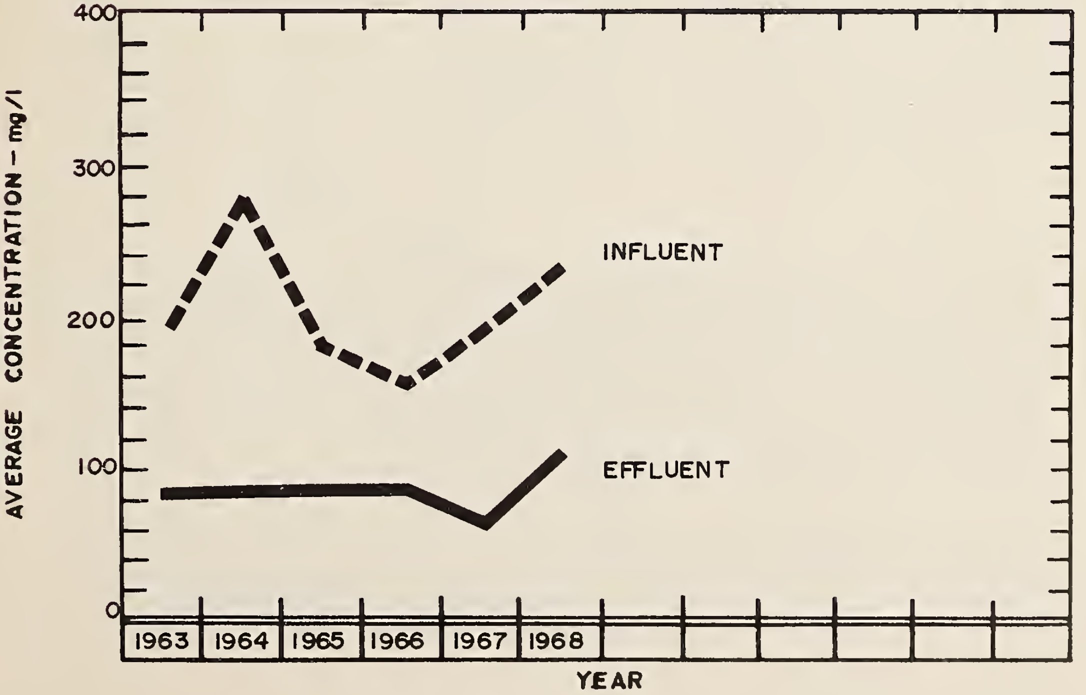


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



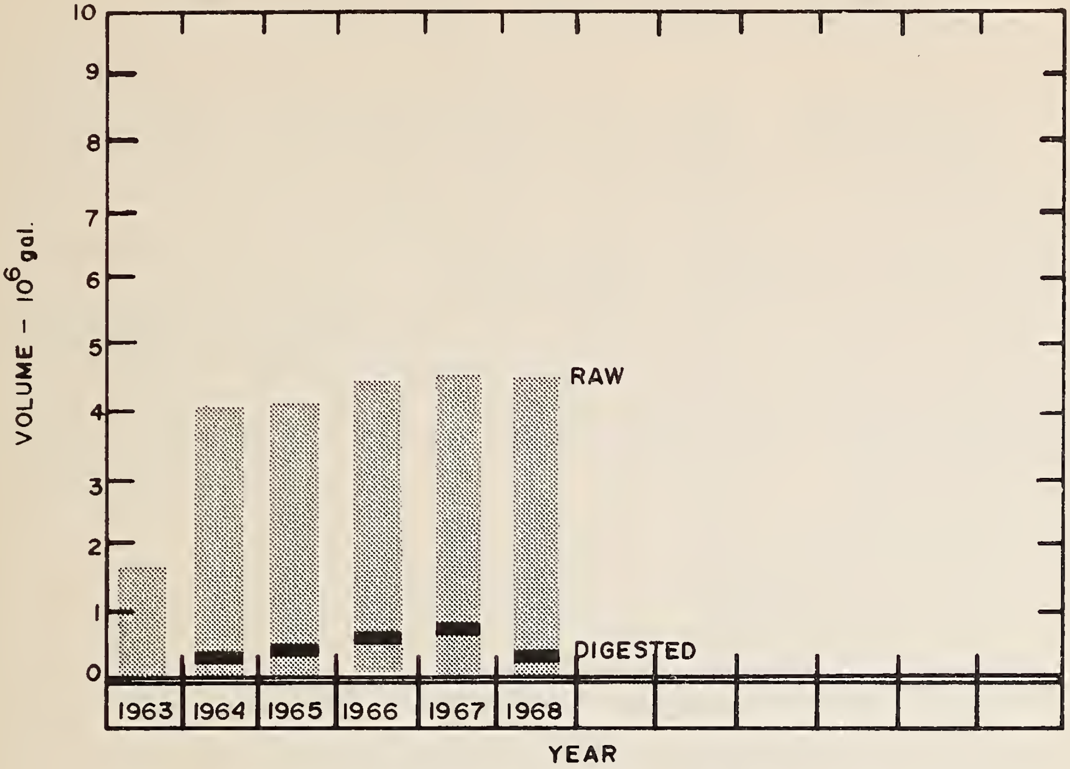
PLANT EFFICIENCY

	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
MONTH	INF CONC^{N} mg/l	EFF CONC^{N} mg/l	RED^{N} %	REMOVAL lb	INF CONC^{N} mg/l	EFF CONC^{N} mg/l	RED^{N} %	REMOVAL 10^5 lb	REMOVAL ft^3
JAN	95	57	40	.80	197	104	48	1.98	-
FEB	220	100	54	2.43	261	147	44	2.31	6
MAR	52	43	17	.19	63	77	0	0	135
APR	-	-	-	-	-	-	-	-	-
MAY	84	43	49	.78	162	105	35	1.09	-
JUN	108	36	67	1.39	170	44	74	2.43	-
JULY	75	21	72	.91	185	67	64	1.99	-
AUG	114	70	39	.76	187	90	52	1.67	6
SEPT	-	-	-	-	175	89	49	1.30	-
OCT	166	70	58	1.43	474	187	60	4.30	-
NOV	-	-	-	-	-	-	-	-	-
DEC	-	-	-	-	-	-	-	-	135
TOTAL	-	-	-	-	-	-	-	-	282
AVERAGE	114	55	52	1.08	234	114	51	2.13	-

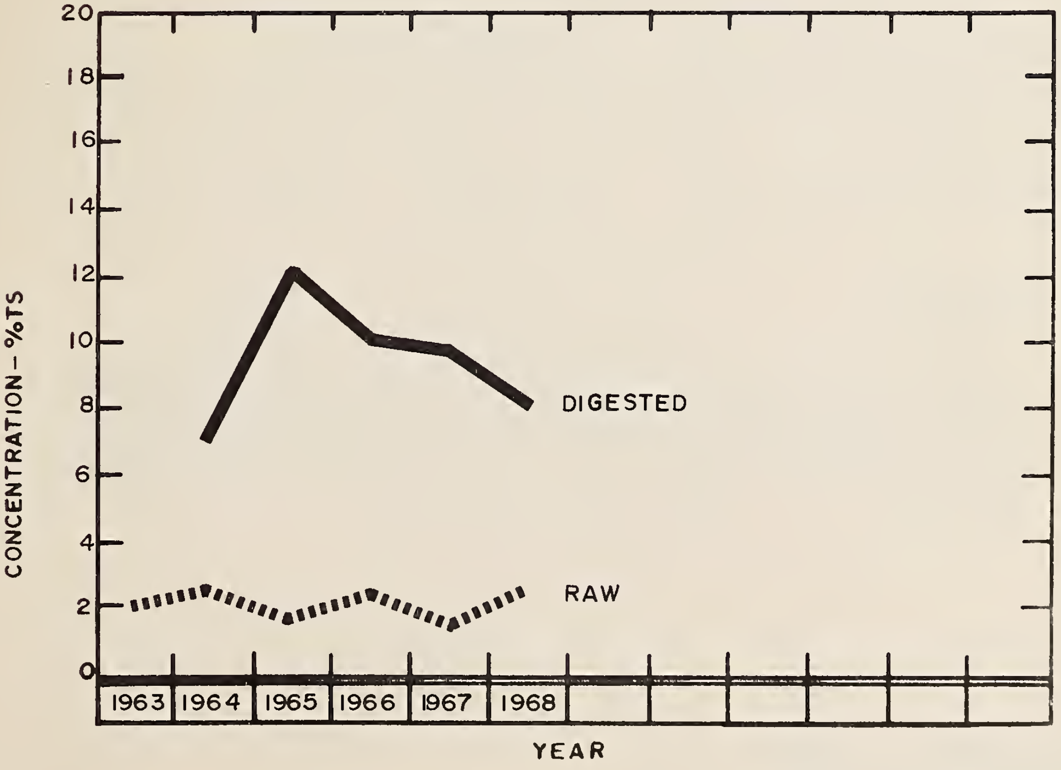
COMMENTS

Composite samples were collected from the Belleville Water Pollution Control Plant and submitted to the OWRC Laboratory for analyses. The results of these analyses indicated that the average BOD and suspended solids of the influent was 114 mg/l and 234 mg/l respectively. The analyses of the BOD and suspended solids in the plant effluent averaged 55 and 114 mg/l respectively. The percent reduction of BOD and suspended solids was 52 and 51 respectively.

These removals are quite satisfactory for a primary treatment plant.


VOLUME - 10^6 gal.
10
9
8
7
6
5
4
3
2
1
0
RAW
DIGESTED
1963
1964
1965
1966
1967
1968
YEAR

DIGESTION


CONCENTRATION - %TS
20
18
16
14
12
10
8
6
4
2
0
DIGESTED
RAW
1963
1964
1965
1966
1967
1968
YEAR

SLUDGE DIGESTION and DISPOSAL

	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
MONTH	VOLUME 10^5 gal	T. S. %	V. S. %	VOLUME 10^4 gal	T. S. %	V. S. %	VOLUME 10^5 gal	T. S. %	LIQUID yd^3	DEWATERED yd^3
JAN	3.82	1.4	77	4.6	10.0	39	-	-	276	-
FEB	3.57	-	-	4.9	-	-	-	-	294	-
MAR	3.82	4.6	66	4.3	6.8	42	-	.1	258	-
APR	3.69	-	-	9.6	-	-	-	-	576	-
MAY	3.82	.8	-	-	14.0	-	-	.2	-	-
JUN	3.69	3.2	44	-	1.7	49	2.47	.2	-	-
JUL	3.84	2.9	59	-	-	-	3.40	.1	-	-
AUG	4.06	2.6	47	.9	-	-	3.25	.1	56	-
SEPT	3.72	1.7	63	-	-	-	1.94	.2	-	-
OCT	3.83	1.8	66	-	-	-	3.59	.3	-	-
NOV	3.60	3.8	50	-	-	-	2.80	.2	-	-
DEC	3.85	1.9	56	-	-	-	3.73	.1	-	-
TOTAL	45.31	-	-	24.3	-	-	21.18	-	1460	-
AVERAGE	3.77	2.4	58	-	8.1	43	-	.2	-	-

COMMENTS

A total of 4,530,000 gallons of raw sludge was pumped to the digester with an average solids concentration of 2.4%. A total of 243,000 gallons of digested sludge was removed from the digesters and hauled away by tank truck. The solids concentration of the digested sludge was 8.1%.

CONCLUSIONS

Plans are being p ville Water Pol-
lution Control Pla g of 1969. Con-
struction may be

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF PLANT OPERATIONS

BELLEVILLE
OPERATING SUMMARY 1968
TD227/B45/W38/1968/MOE
COPY #1

DATE C. 1 ISSUED TO asen
LABORATORY LIBRARY
ONTARIO WATER RESOURCES COMMISSION

TD227/B45/W38/1968/MOE
Ontario Water Resources Co
Belleville water
pollution control asen
c.1 a aa

Environment Ontario
Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
Canada

TD
367
.A56
B45
1968

Belleville : water pollution
control plant.
81624

Water management in Ontario